**CETECOM™****CETECOM ICT Services**  
consulting - testing - certification >>>

## TEST REPORT

Test report no.: 1-6160/13-01-22

Deutsche  
Akkreditierungsstelle  
D-PL-12076-01-00

### Testing laboratory

**CETECOM ICT Services GmbH**

Untertuerkheimer Strasse 6 – 10

66117 Saarbruecken / Germany

Phone: + 49 681 5 98 - 0

Fax: + 49 681 5 98 - 9075

Internet: <http://www.cetecom.com>e-mail: [ict@cetecom.com](mailto:ict@cetecom.com)**Accredited Testing Laboratory:**

The testing laboratory (area of testing) is accredited according to DIN EN ISO/IEC 17025 (2005) by the Deutsche Akkreditierungsstelle GmbH (DAkkS)

The accreditation is valid for the scope of testing procedures as stated in the accreditation certificate with the registration number: D-PL-12076-01-00

### Applicant

**Pegatron Corporation**

5F, No. 76, Ligong Street Beitou District

11261 Taipei City / TAIWAN

Fax: +88 68 99 48 82 38

Contact: Brian Chen

e-mail: [brian3\\_chen@pegatroncorp.com](mailto:brian3_chen@pegatroncorp.com)

Phone: +88 64 37 02 22 33

### Manufacturer

**Pegatron Corporation**

5F, No. 76, Ligong Street Beitou District

11261 Taipei City / TAIWAN

### Test standard/s

47 CFR Part 15

Title 47 of the Code of Federal Regulations; Chapter I; Part 15 - Radio frequency devices

RSS - 210 Issue 8

Spectrum Management and Telecommunications Radio Standards Specification - Licence-exempt Radio Apparatus (All Frequency Bands): Category I Equipment

For further applied test standards please refer to section 3 of this test report.

### Test Item

**Kind of test item:** Car Media System**Model name:** SDIS1**FCC ID:** VPYLBZT**IC:** 772C-LBZT

Frequency: ISM band 2400 to 2483.5 MHz

Technology tested: Bluetooth® LE

Antenna: Integrated antenna

Power supply: 12.0V DC by car battery

Temperature range: -20°C to +55°C



This test report is electronically signed and valid without handwriting signature. For verification of the electronic signatures, the public keys can be requested at the testing laboratory.

### Test report authorised:

Stefan BöS  
Professional  
Radio Communications & EMC

### Test performed:

Tobias Wittenmeier  
Experienced  
Radio Communications & EMC

**1 Table of contents**

1	Table of contents .....	2
2	General information .....	3
2.1	Notes and disclaimer .....	3
2.2	Application details .....	3
3	Test standard/s .....	3
4	Test environment .....	4
5	Test item .....	4
5.1	Additional information .....	4
6	Test laboratories sub-contracted .....	4
7	Summary of measurement results .....	5
8	Additional comments .....	6
9	Description of test setup .....	7
9.1	Radiated measurements .....	7
9.2	Radiated measurements chamber C .....	8
9.3	Radiated measurements 12.75 GHz to 26 GHz .....	9
10	Measurement results .....	10
10.1	Antenna gain .....	10
10.2	Maximum output power .....	11
10.3	Band edge compliance radiated .....	13
10.4	TX spurious emissions radiated .....	15
10.5	RX spurious emissions radiated .....	26
10.6	Spurious emissions radiated < 30 MHz .....	30
11	Test equipment and ancillaries used for tests .....	32
12	Observations .....	34
Annex A	Document history .....	35
Annex B	Further information .....	35
Annex C	Accreditation Certificate .....	36

## 2 General information

### 2.1 Notes and disclaimer

The test results of this test report relate exclusively to the test item specified in this test report. CETECOM ICT Services GmbH does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item.

The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of CETECOM ICT Services GmbH.

The testing service provided by CETECOM ICT Services GmbH has been rendered under the current "General Terms and Conditions for CETECOM ICT Services GmbH".

CETECOM ICT Services GmbH will not be liable for any loss or damage resulting from false, inaccurate, inappropriate or incomplete product information provided by the customer.

Under no circumstances does the CETECOM ICT Services GmbH test report include any endorsement or warranty regarding the functionality, quality or performance of any other product or service provided.

Under no circumstances does the CETECOM ICT Services GmbH test report include or imply any product or service warranties from CETECOM ICT Services GmbH, including, without limitation, any implied warranties of merchantability, fitness for purpose, or non-infringement, all of which are expressly disclaimed by CETECOM ICT Services GmbH.

All rights and remedies regarding vendor's products and services for which CETECOM ICT Services GmbH has prepared this test report shall be provided by the party offering such products or services and not by CETECOM ICT Services GmbH.

In no case this test report can be considered as a Letter of Approval.

This test report is electronically signed and valid without handwritten signature. For verification of the electronic signatures, the public keys can be requested at the testing laboratory.

### 2.2 Application details

Date of receipt of order:	2013-08-21
Date of receipt of test item:	2014-10-13
Start of test:	2014-10-20
End of test:	2014-10-29
Person(s) present during the test:	-/-

## 3 Test standard/s

Test standard	Date	Test standard description
47 CFR Part 15	-/-	Title 47 of the Code of Federal Regulations; Chapter I; Part 15 - Radio frequency devices
RSS - 210 Issue 8	01.12.2010	Spectrum Management and Telecommunications Radio Standards Specification - Licence-exempt Radio Apparatus (All Frequency Bands): Category I Equipment

#### 4 Test environment

Temperature:	$T_{nom}$	+22 °C during room temperature tests
	$T_{max}$	+55 °C during high temperature tests
	$T_{min}$	-20 °C during low temperature tests
Relative humidity content:		55 %
Barometric pressure:		not relevant for this kind of testing
Power supply:	$V_{nom}$	12.0 V DC by car battery
	$V_{max}$	13.2 V
	$V_{min}$	10.8 V

#### 5 Test item

Kind of test item	:	Car Media System
Type identification	:	SDIS1
S/N serial number	:	No information available
HW hardware status	:	C101
SW software status	:	SDIS1R_0.344_dev_AU_ER_sdis1_er-userdebug
Frequency band [MHz]	:	ISM band 2400 to 2483.5 MHz
Type of radio transmission	:	DSSS, FHSS
Use of frequency spectrum	:	
Type of modulation	:	QPSK
Number of channels	:	39
Antenna	:	Integrated antenna
Power supply	:	12.0 V DC by car battery
Temperature range	:	-20°C to +55 °C

##### 5.1 Additional information

The content of the following annexes is defined in the QA. It may be that not all of the listed annexes are necessary for this report, thus some values in between may be missing.

Test setup- and EUT-photos are included in test report:

- 1-6160/13-01-01\_AnnexA
- 1-6160/13-01-01\_AnnexB
- 1-6160/13-01-01\_AnnexD

#### 6 Test laboratories sub-contracted

None

## 7 Summary of measurement results



No deviations from the technical specifications were ascertained



There were deviations from the technical specifications ascertained

TC Identifier	Description	Verdict	Date	Remark
RF-Testing	CFR Part 15 RSS 210, Issue 8, Annex 8	Passed	2014-11-13	Reduced tests according customer test list

Test specification clause	Test case	Temperature conditions	Power source voltages	Mode	Pass	Fail	NA	NP	Remark
§15.247(b)(4) RSS 210 / A8.4(2)	Antenna gain	Nominal	Nominal	GFSK	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	complies
§15.247(e) RSS 210 / A8.2(b)	Power spectral density	Nominal	Nominal	GFSK	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	-/-
§15.247(a)(1) RSS 210 / A8.1(b)	Carrier frequency separation	Nominal	Nominal	GFSK	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	-/-
§15.247(a)(1) RSS 210 / A8.1(d)	Number of hopping channels	Nominal	Nominal	GFSK	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	-/-
§15.247(a)(1) (iii) RSS 210 / A8.3(1)	Time of occupancy (dwell time)	Nominal	Nominal	GFSK	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	-/-
§15.247(a)(2) RSS 210 / A8.2(a)	Spectrum bandwidth of a FHSS system 6 dB bandwidth	Nominal	Nominal	GFSK	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	-/-
§15.247(a)(1) RSS 210	Spectrum bandwidth of a FHSS system 20 dB bandwidth	Nominal	Nominal	GFSK	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	-/-
§15.247(b)(1) RSS-210 / A8.4(2)	Maximum output power	Nominal	Nominal	GFSK	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	complies
§15.247(d) RSS-210 / A8.5	Band edge compliance conducted	Nominal	Nominal	GFSK	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	-/-
§15.205 RSS-210 / A8.5	Band edge compliance radiated	Nominal	Nominal	GFSK	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	complies
§15.247(d) RSS-210 / A8.5	TX spurious emissions conducted	Nominal	Nominal	GFSK	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	-/-
§15.247(d) RSS-210 / A8.5	TX spurious emissions radiated	Nominal	Nominal	GFSK	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	complies
§15.109 RSS-Gen.	RX spurious emissions radiated	Nominal	Nominal	-/-	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	complies
§15.209(a) RSS-Gen	TX spurious emissions radiated < 30 MHz	Nominal	Nominal	GFSK	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	complies
§15.107(a) §15.207	Conducted emissions < 30 MHz	Nominal	Nominal	GFSK	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	-/-

**Note:** NA = Not Applicable; NP = Not Performed

## 8 Additional comments

The Bluetooth<sup>®</sup> word mark and logos are owned by the Bluetooth SIG Inc. and any use of such marks by Cetecom ICT Services GmbH is under license.

Reference documents: Main Test Report No. RF140815C17-2

Special test descriptions: Delta-Test only acc. customers demand

Configuration descriptions: TX tests: were performed with LE packets (37 byte payload) and static PRBS pattern.  
RX/Standby tests: BT enabled, TX Idle

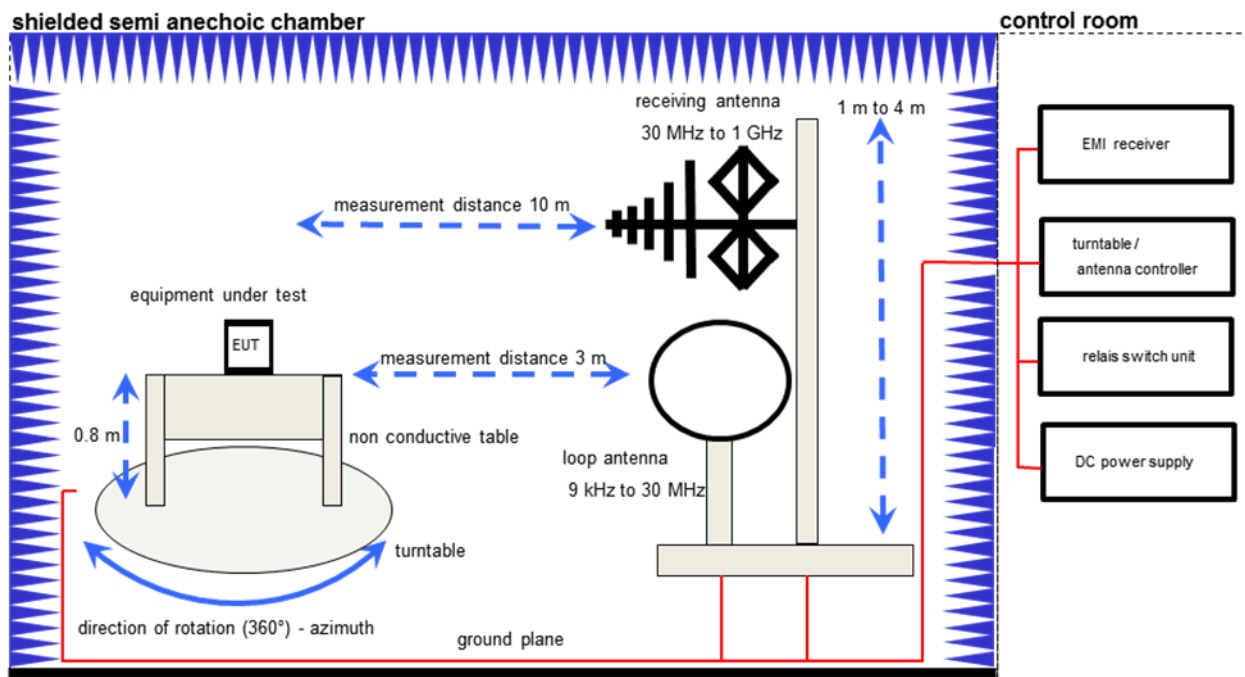
Test mode:

- ☐ Bluetooth LE Test mode enabled  
(EUT is controlled over CBT)
- ☒ Special software is used.  
EUT is transmitting pseudo random data by itself

## 9 Description of test setup

### 9.1 Radiated measurements

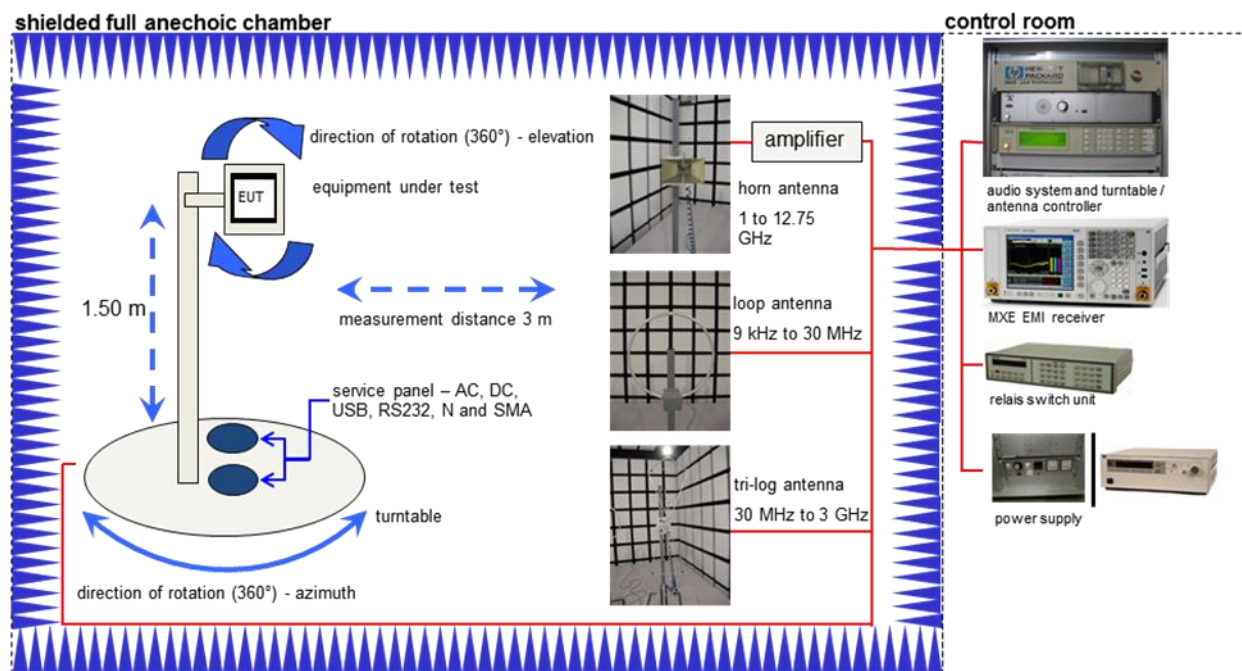
The radiated measurements are performed in vertical and horizontal plane in the frequency range from 9 kHz to 1 GHz in semi-anechoic chambers. The EUT is positioned on a non-conductive support with a height of 0.80 m above a conductive ground plane that covers the whole chamber. The receiving antennas are confirmed with specifications ANSI C63. These antennas can be moved over the height range between 1.0 m and 4.0 m in order to search for maximum field strength emitted from EUT. The measurement distances between EUT and receiving antennas are indicated in the test setups for the various frequency ranges. For each measurement, the EUT is rotated in all three axes until the maximum field strength is received. The wanted and unwanted emissions are received by spectrum analysers where the detector modes and resolution bandwidths over various frequency ranges are set according to requirement ANSI C63.



#### Equipment table:

Equipment	Type	Manufacturer	Serial No.	INV. No Cetecom
Software	EMC32 V.   9.12.05	R&S	-/-	-/-
Switch-Unit	3488A	HP Meßtechnik	2719A14505	300000368
DC power supply, 60Vdc, 50A, 1200 W	6032A	HP Meßtechnik	2920A04466	300000580
EMI Test Receiver	ESCI 3	R&S	100083	300003312
Amplifier	JS42-00502650-28-5A	MITEQ	1084532	300003379
Antenna Tower	Model 2175	ETS-LINDGREN	64762	300003745
Positioning Controller	Model 2090	ETS-LINDGREN	64672	300003746
Turntable Interface-Box	Model 105637	ETS-LINDGREN	44583	300003747
TRILOG Broadband Test-Antenna 30 MHz - 3 GHz	VULB9163	Schwarzbeck	295	300003787
Test Receiver	ESH2	R&S	871921/095	300002505
EMI Test Receiver 9 kHz - 3 GHz incl. Preselector	ESPI3	R&S	101713	300004059

## 9.2 Radiated measurements chamber C



### Equipment table:

Equipment	Type	Manufacturer	Serial No.	INV. No Cetecom
MXE EMI Receiver 20 Hz bis 26,5 GHz	N9038A	Agilent Technologies	MY51210197	300004405
TRILOG Broadband Test-Antenna 30 MHz - 3 GHz	VULB9163	Schwarzbeck	371	300003854
Band Reject filter	WRCG2400/2483-2375/2505-50/10SS	Wainwright	11	300003351
Highpass Filter	WHKX7.0/18G-8SS	Wainwright	18	300003789
Double-Ridged Waveguide Horn Antenna 1-18.0GHz	3115	EMCO	8812-3088	300001032
Active Loop Antenna	6502	EMCO	8905-2342	300000256
Anechoic chamber	FAC 3/5m	MWB / TDK	87400/02	300000996
Switch / Control Unit	3488A	HP Meßtechnik	*	300000199
Switch / Control Unit	3488A	HP Meßtechnik	2719A15013	300001156
Isolating Transformer	MPL IEC625 Bus Regeltrenntravo	ErFi	91350	300001155
Three-Way Power Splitter, 50 Ohm	11850C	HP Meßtechnik		300000997
Amplifier	js42-00502650-28-5a	Parzich GMBH	928979	300003143



**9.3 Radiated measurements 12.75 GHz to 26 GHz****Equipment table:**

Equipment	Type	Manufacturer	Serial No.	INV. No Cetecom
Std. Gain Horn Antenna 12.4 to 18.0 GHz	639	Narda	8402	300000787
Std. Gain Horn Antenna 18.0 to 26.5 GHz	638	Narda	8205	300002442
Microwave System Amplifier, 0.5-26.5 GHz	83017A	HP Meßtechnik	00419	300002268
Spectrum Analyzer 20 Hz - 50 GHz	FSU50	R&S	200012	300003443
Signal Analyzer 40 GHz	FSV40	R&S	101042	300004517

## 10 Measurement results

### 10.1 Antenna gain

#### Measurement:

The antenna gain of the complete system is calculated by the difference of radiated power in EIRP and the conducted power of the module. For normal Bluetooth® devices, the GFSK modulation is used.

#### Measurement parameters:

Measurement parameter	
Detector:	Peak
Sweep time:	Auto
Resolution bandwidth:	3 MHz
Video bandwidth:	3 MHz
Span:	5 MHz
Trace-Mode:	Max hold

#### Limits:

FCC	IC
Antenna Gain	
6 dBi	

#### Results:

T <sub>nom</sub>	V <sub>nom</sub>	lowest channel 2402 MHz	middle channel 2440 MHz	highest channel 2480 MHz
Conducted power [dBm] Measured with GFSK modulation		-1.8	-2.0	-1.8
Radiated power [dBm] Measured with GFSK modulation		0.5	0.5	-0.68
Gain [dBi] Calculated		2.3	2.5	1.12

**Result:** **Passed**

## 10.2 Maximum output power

### Description:

Measurement of the maximum output power conducted and radiated according the **FCC requirements**. The measurements are performed using the data rate producing the highest conducted output power. The duty cycle is measured before and the resulting correction factor is added to every measurement as offset value. You can see the offset values in the plots.

### Measurement:

Measurement parameter	
According to DTS clause: 9.2.2.5	
Detector:	RMS
Sweep time:	See Plots.
Resolution bandwidth:	500 kHz
Video bandwidth:	3 MHz
Span:	40 MHz
Integration bandwidth:	99% power - bandwidth (OBW)
Trace-Mode:	Max hold (allow trace to fully stabilize)
Measurement function:	Channel power with OBW

### Limits:

FCC	
Maximum Output Power	
Conducted: 1.0 W – Antenna Gain max. 6 dBi	

### Results:

GFSK Frequency	Maximum Output Power [dBm]		
	2412 MHz	2441 MHz	2480 MHz
Output power conducted including DC corr.	-5.35	-5.62	-5.93
Measurement uncertainty	± 1.5 dB (cond.)		

Maximum output power radiated: -5.35 dBm + 2.5 dBi = -2.85 dBm EIRP

**Result:** **Passed**

**Description:**

Measurement of the maximum output power conducted and radiated according the **Canadian requirements**. The measurements are performed using the data rate producing the highest conducted output power.

**Measurement:**

Measurement parameter	
Detector:	Peak
Sweep time:	Auto
Resolution bandwidth:	1 MHz
Video bandwidth:	10 MHz
Span:	15 MHz
Integration bandwidth:	75 % power - bandwidth (DTS BW)
Trace-Mode:	Max hold (allow trace to fully stabilize)
Measurement function:	Channel power with DTS BW

**Limits:**

	IC
Maximum Output Power	
Conducted: 1.0 W – Antenna Gain max. 6 dBi	

**Results:**

GFSK Frequency	Maximum Output Power [dBm]		
	2402 MHz	2441 MHz	2480 MHz
Peak output power conducted	-4.89	-5.42	-5.94
Measurement uncertainty	± 1.5 dB (cond.)		

Maximum output power radiated: -4.89 dBm + 2.5 dBi = -2.39 dBm EIRP

**Result:** **Passed**

### 10.3 Band edge compliance radiated

#### Description:

Measurement of the radiated band edge compliance. The EUT is turned in the position that results in the maximum level at the band edge. Then a sweep over the corresponding restricted band is performed. The EUT is set to single channel mode and the transmit channel is channel 00 for the lower restricted band and channel 39 for the upper restricted band. The measurement is repeated for all modulations. Measurement distance is 3m.

#### Measurement:

Measurement parameter	
Detector:	Peak
Sweep time:	Auto
Resolution bandwidth:	1 MHz
Video bandwidth:	10 Hz
Span:	Lower Band: 2300 – 2400 MHz Upper Band: 2480 – 2500 MHz
Trace-Mode:	Max Hold

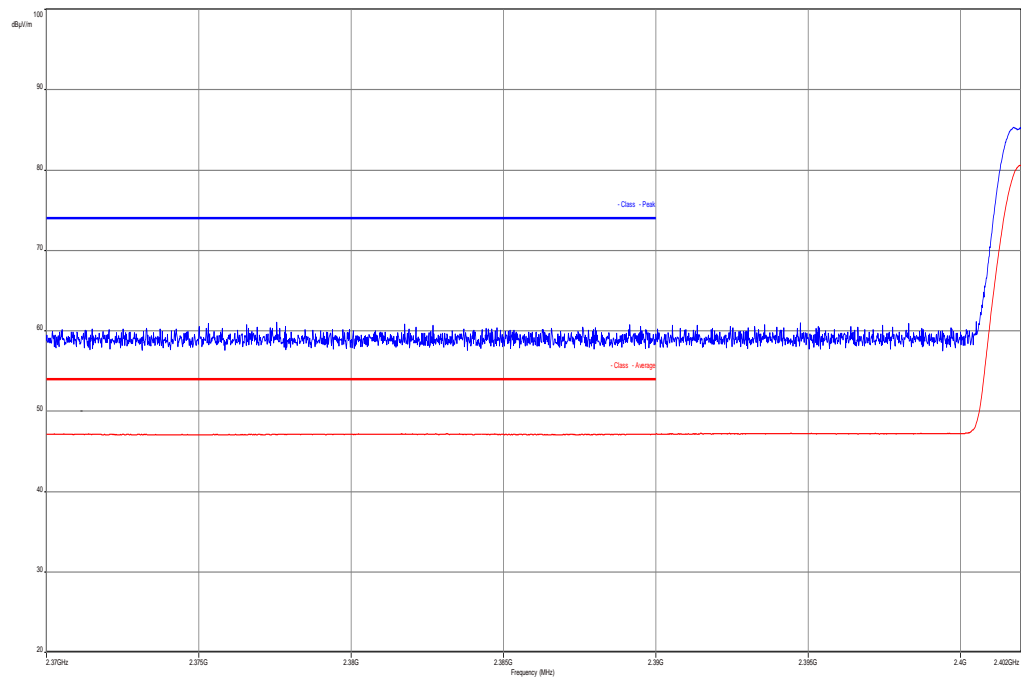
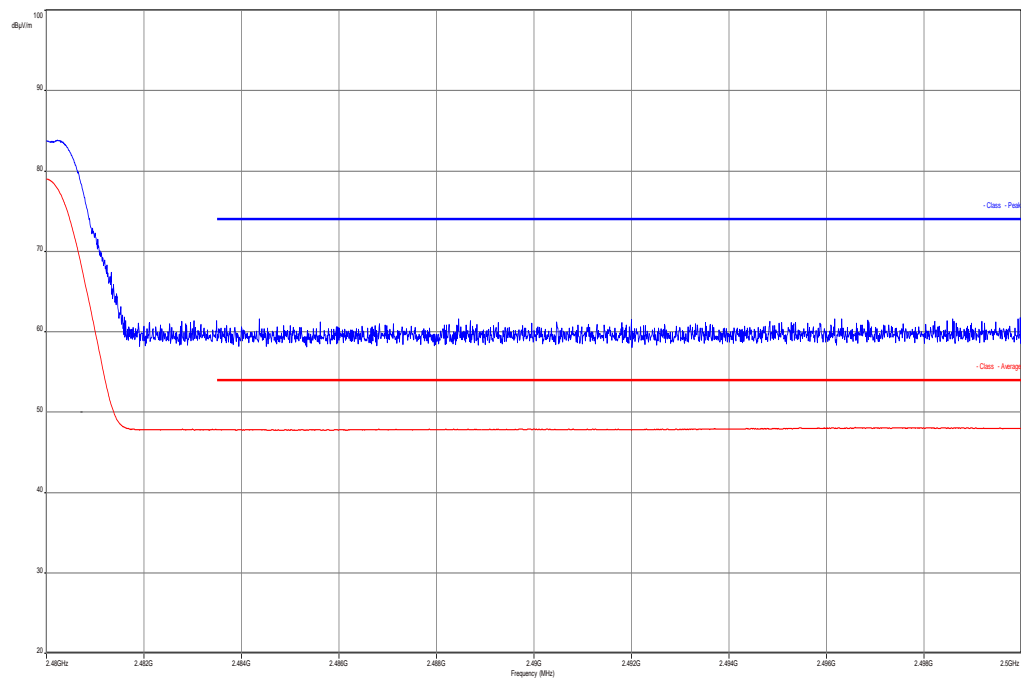
#### Limits:

FCC	IC
Band edge compliance radiated	
<p>In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 5.205(c)).</p>	
54 dBµV/m AVG 74 dBµV/m Peak	

#### Result:

Scenario	Band edge compliance radiated [dBµV/m]
Modulation	GFSK
Lower restricted band	< 54 AVG / < 74 PP (see plot 1)
Upper restricted band	< 54 AVG / < 74 PP (see plot 2)
Measurement uncertainty	± 3 dB

**Result:** Passed

**Plots:****Plot 1: Lower restricted band****Plot 2: Upper restricted band**

## 10.4 TX spurious emissions radiated

### Description:

Measurement of the radiated spurious emissions in transmit mode. The EUT is set to single channel mode and the transmit channel is channel 00, channel 19 and channel 39. The measurement is performed in the mode with the highest output power.

### Measurement:

Measurement parameter	
Detector:	Peak / Quasi Peak
Sweep time:	Auto
Resolution bandwidth:	F < 1 GHz: 100 kHz F > 1 GHz: 1 MHz
Video bandwidth:	3 x RBW Remeasurement: 10 Hz
Span:	30 MHz to 26 GHz
Trace-Mode:	Max Hold
Measured Modulation:	GFSK

The modulation with the highest output power was used to perform the transmitter spurious emissions. If spurious were detected a re-measurement was performed on the detected frequency with each modulation.

### Limits:

FCC		IC
TX spurious emissions radiated		
<p>In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required.</p> <p>In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).</p>		
§15.209		
Frequency (MHz)	Field strength (dBμV/m)	Measurement distance
30 - 88	30.0	10
88 – 216	33.5	10
216 – 960	36.0	10
Above 960	54.0	3

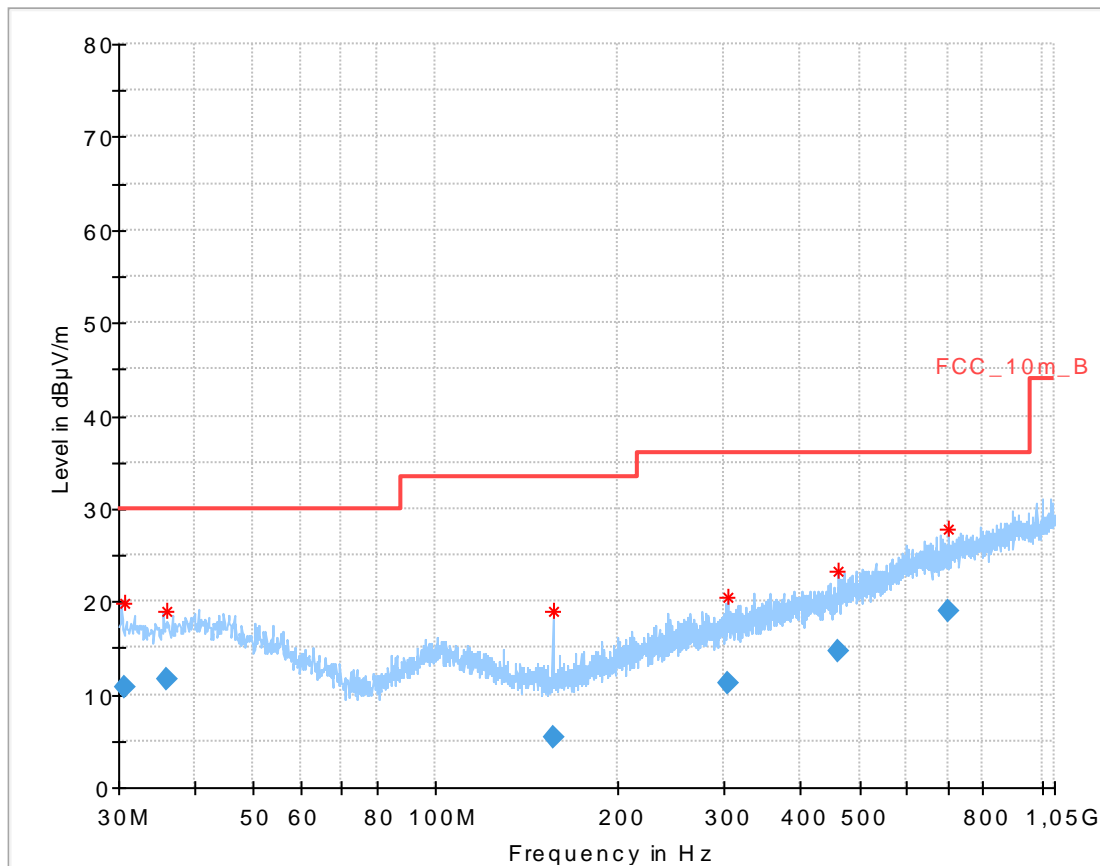
**Results:**

TX spurious emissions radiated [dB $\mu$ V/m]								
2402 MHz			2441 MHz			2480 MHz		
F [MHz]	Detector	Level [dB $\mu$ V/m]	F [MHz]	Detector	Level [dB $\mu$ V/m]	F [MHz]	Detector	Level [dB $\mu$ V/m]
For emissions below 1 GHz, please take a look at the table below the 1 GHz plot.			For emissions below 1 GHz, please take a look at the table below the 1 GHz plot.			For emissions below 1 GHz, please take a look at the table below the 1 GHz plot.		
All peak emissions above 1 GHz are more Than 6 dB below the average limit			All peak emissions above 1 GHz are more Than 6 dB below the average limit			All peak emissions above 1 GHz are more Than 6 dB below the average limit		
Measurement uncertainty			$\pm 3$ dB					

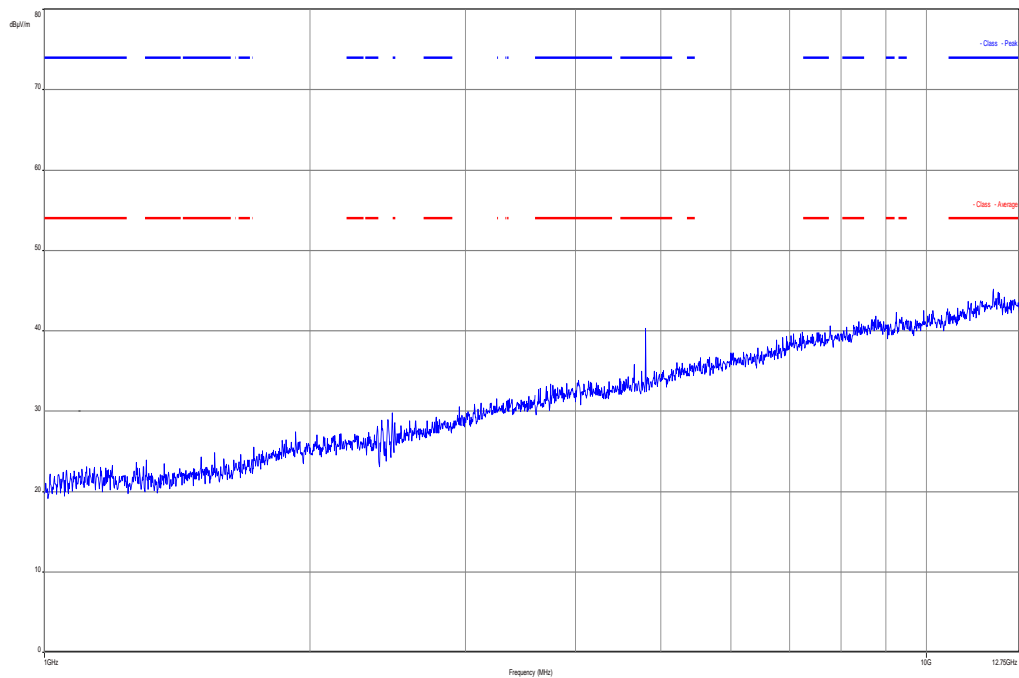
**Result:** Passed

**Note:** The limit was recalculated with 20 dB / decade (Part 15.31) for all radiated spurious emissions 30 MHz to 1 GHz from 3 meter limit to a 10 meter distance. (40dB/decade for emissions < 30MHz)

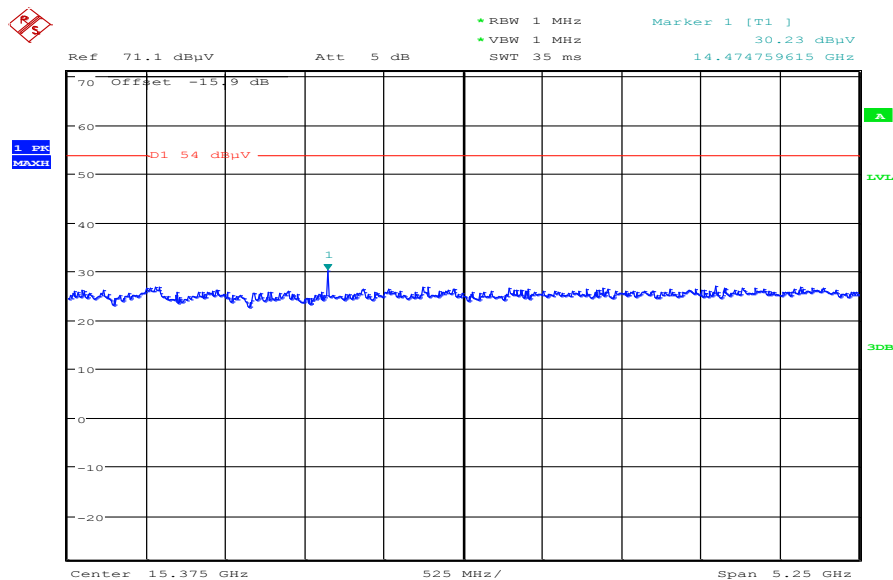


**Plots:****Plot 1:** 30 MHz to 1 GHz, lowest channel, vertical & horizontal polarization**Final\_Result**

Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
30.772386	10.78	30.00	19.22	1000.0	120.000	101.0	H	270	13.4
35.957550	11.69	30.00	18.31	1000.0	120.000	101.0	V	115	13.8
156.545700	5.37	33.50	28.13	1000.0	120.000	101.0	V	205	9.0
303.885600	11.21	36.00	24.79	1000.0	120.000	170.0	H	269	14.6
462.095850	14.60	36.00	21.40	1000.0	120.000	170.0	V	295	17.9
703.198200	18.98	36.00	17.02	1000.0	120.000	170.0	H	25	21.6

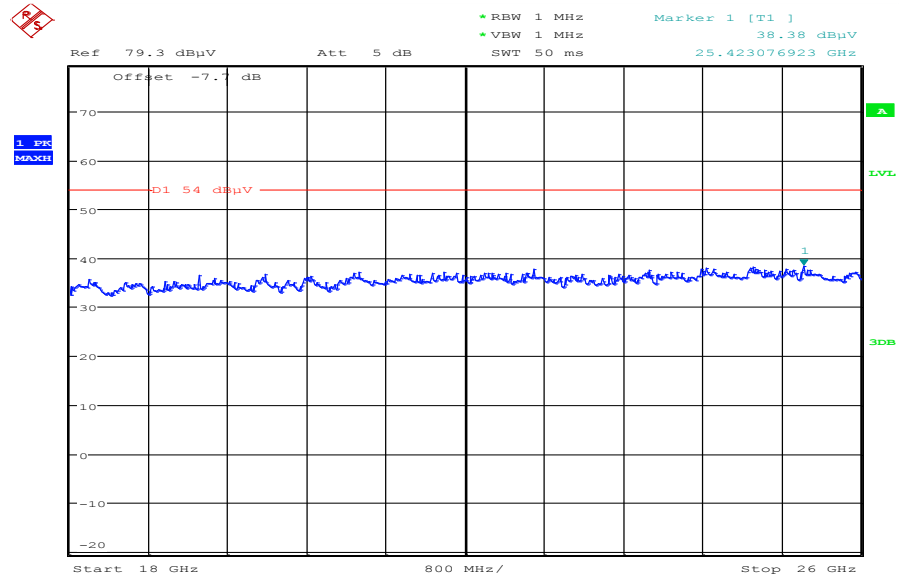
**Plot 2:** 1 GHz to 12.75 GHz, lowest channel, vertical & horizontal polarization

Carrier suppressed with a 2.4 GHz-band rejection filter.

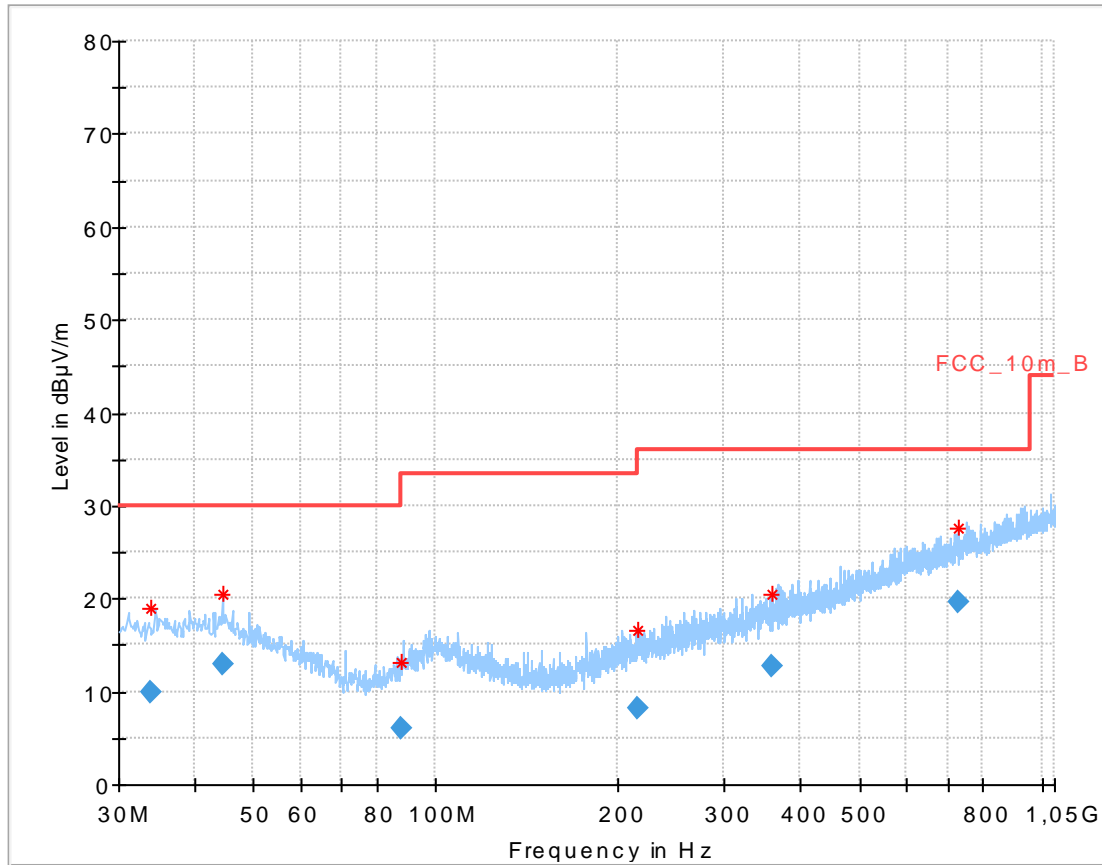
**Plot 3:** 12 GHz to 18 GHz, lowest channel, vertical & horizontal polarization

Date: 24.OCT.2014 11:51:58

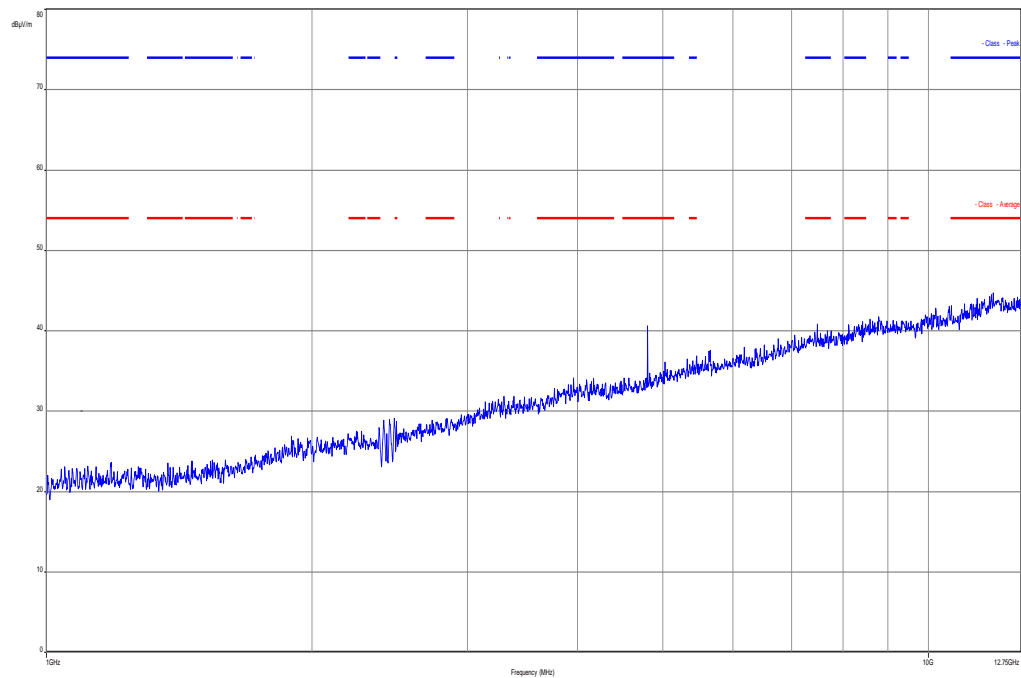
**Plot 4:** 18 GHz to 26 GHz, lowest channel, vertical & horizontal polarization



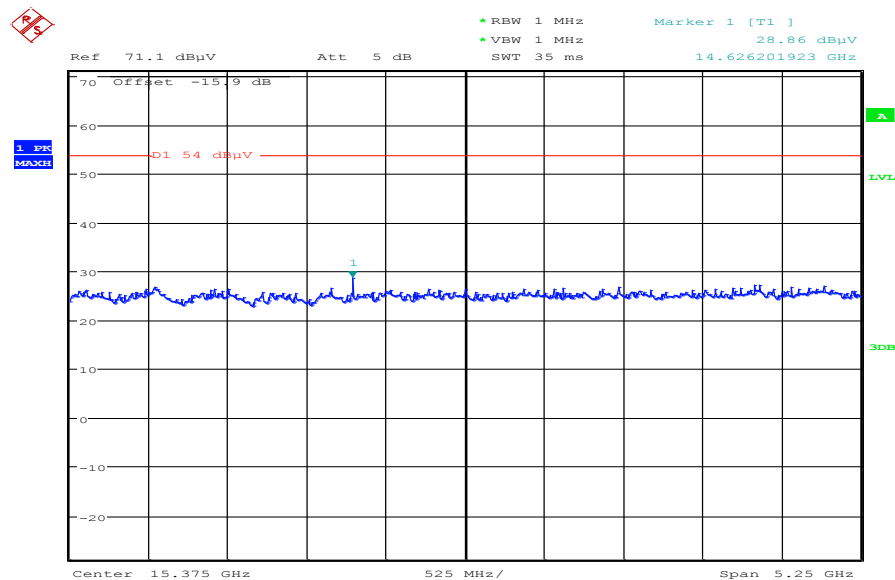
Date: 24.OCT.2014 12:07:12

**Plot 5:** 30 MHz to 1 GHz, mid channel, vertical & horizontal polarization**Final\_Result**

Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
33.864600	9.89	30.00	20.11	1000.0	120.000	170.0	H	-1	13.7
44.525400	12.99	30.00	17.01	1000.0	120.000	101.0	V	25	13.9
87.681900	5.96	30.00	24.04	1000.0	120.000	170.0	H	65	9.9
215.599500	8.28	33.50	25.22	1000.0	120.000	170.0	V	90	12.2
358.646250	12.81	36.00	23.19	1000.0	120.000	170.0	H	295	16.2
729.758850	19.56	36.00	16.44	1000.0	120.000	170.0	H	295	22.2

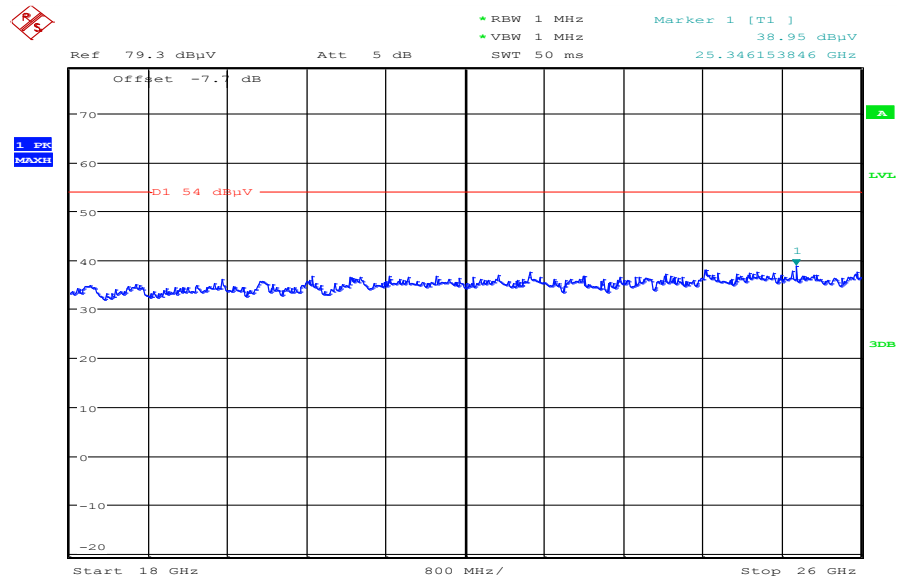
**Plot 6:** 1 GHz to 12.75 GHz, mid channel, vertical & horizontal polarization


Carrier suppressed with a 2.4 GHz-band rejection filter.

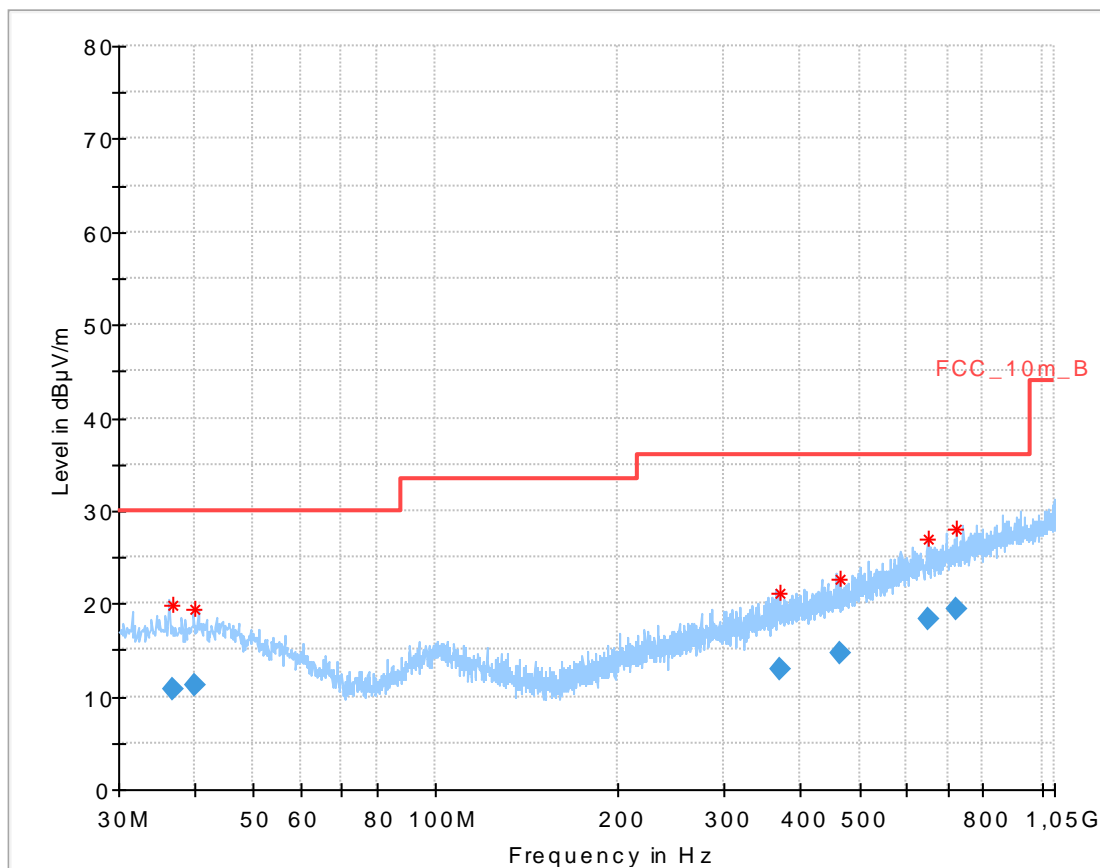
**Plot 7:** 12 GHz to 18 GHz, mid channel, vertical & horizontal polarization


Date: 24.OCT.2014 11:53:00

**Plot 8:** 18 GHz to 26 GHz, mid channel, vertical & horizontal polarization

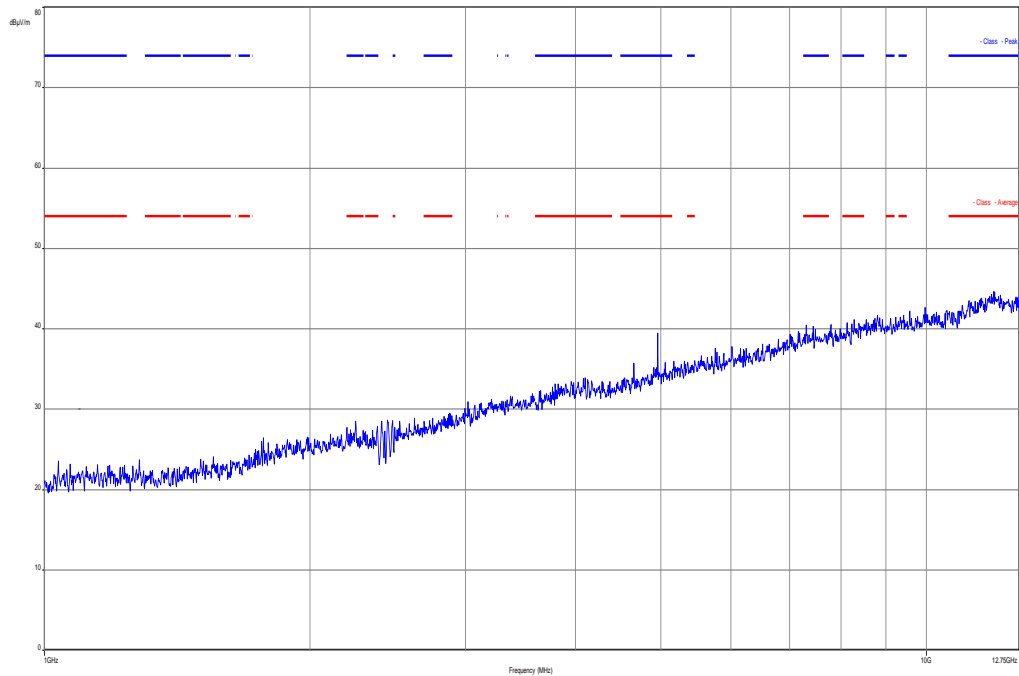


Date: 24.OCT.2014 12:07:59

**Plot 9:** 30 MHz to 1 GHz, highest channel, vertical & horizontal polarization**Final\_Result**

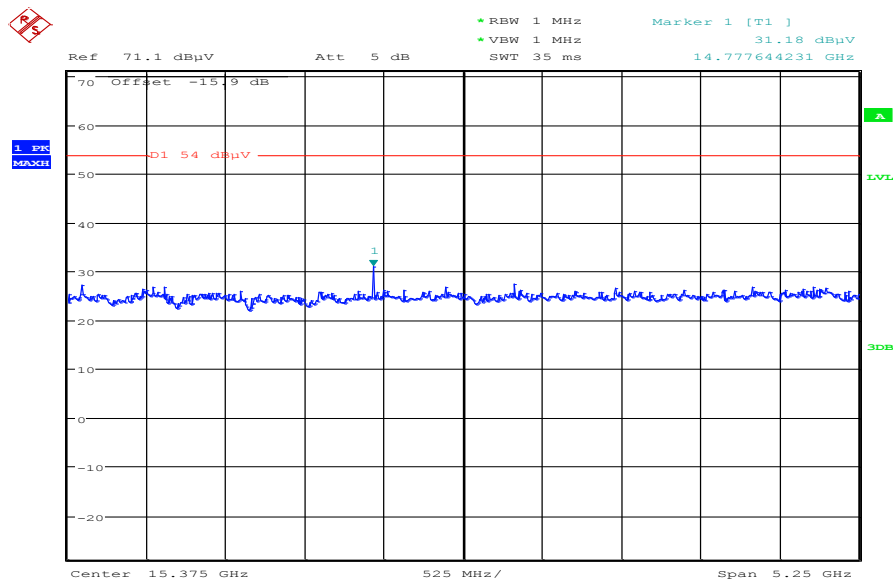
Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
36.741750	10.84	30.00	19.16	1000.0	120.000	170.0	V	0	13.9
40.020300	11.20	30.00	18.80	1000.0	120.000	100.0	H	270	14.0
368.773650	12.93	36.00	23.07	1000.0	120.000	170.0	H	205	16.4
465.879750	14.70	36.00	21.30	1000.0	120.000	98.0	V	155	18.0
648.306750	18.42	36.00	17.58	1000.0	120.000	170.0	V	155	21.1
724.692150	19.43	36.00	16.57	1000.0	120.000	170.0	V	269	22.1

**Plot 10:** 1 GHz to 12.75 GHz, highest channel, vertical & horizontal polarization



Carrier suppressed with a 2.4 GHz-band rejection filter.

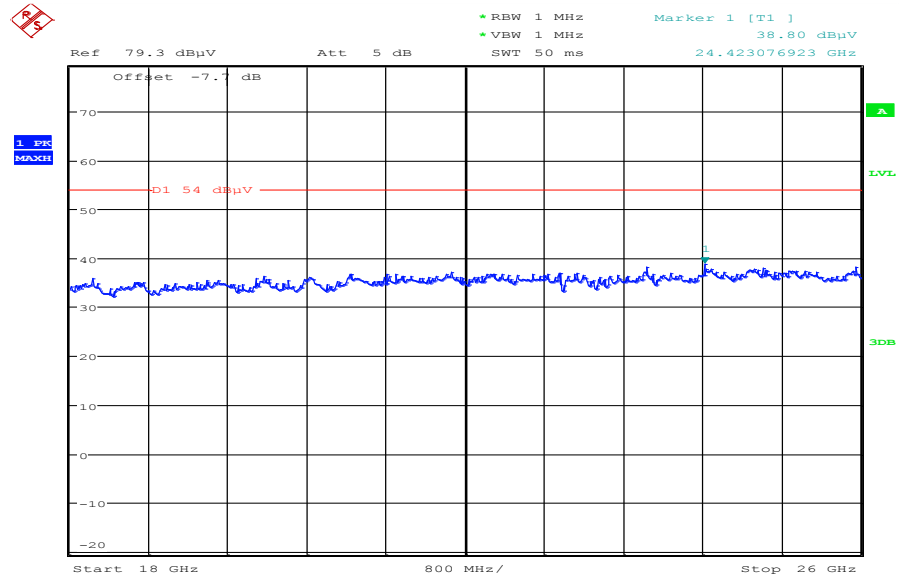
**Plot 11:** 12 GHz to 18 GHz, highest channel, vertical & horizontal polarization



Date: 24.OCT.2014 11:53:41



**Plot 12:** 18 GHz to 26 GHz, highest channel, vertical & horizontal polarization



Date: 24.OCT.2014 12:08:42

## 10.5 RX spurious emissions radiated

### Description:

Measurement of the radiated spurious emissions in idle/receive mode. The EUT is detached so all oscillators are active.

### Measurement:

Measurement parameter	
Detector:	Peak / Quasi peak
Sweep time:	Auto
Resolution bandwidth:	F < 1 GHz: 100 kHz F > 1 GHz: 1 MHz
Video bandwidth:	3 x RBW Remeasurement: 10 Hz
Span:	30 MHz to 26 GHz
Trace-Mode:	Max Hold

### Limits:

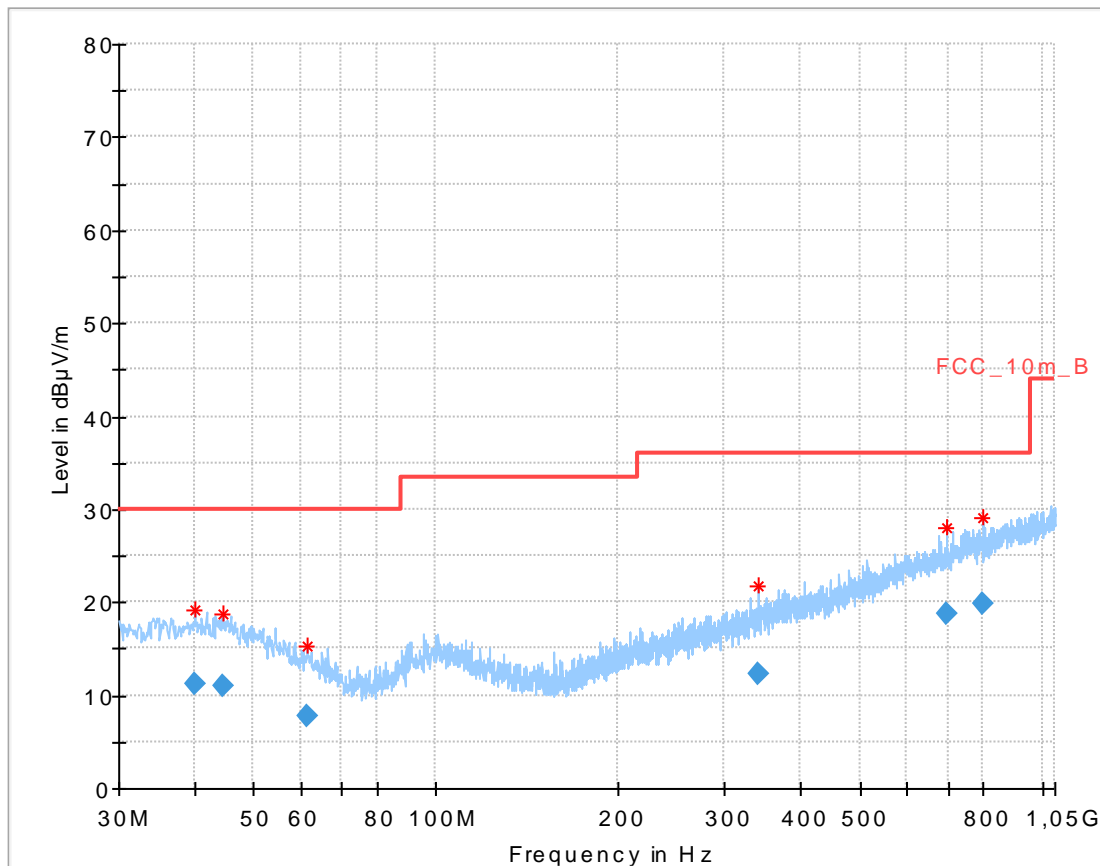
FCC		IC
RX Spurious Emissions Radiated		
Frequency (MHz)	Field strength (dB $\mu$ V/m)	Measurement distance
30 - 88	30.0	10
88 - 216	33.5	10
216 - 960	36.0	10
Above 960	54.0	3

### Results:

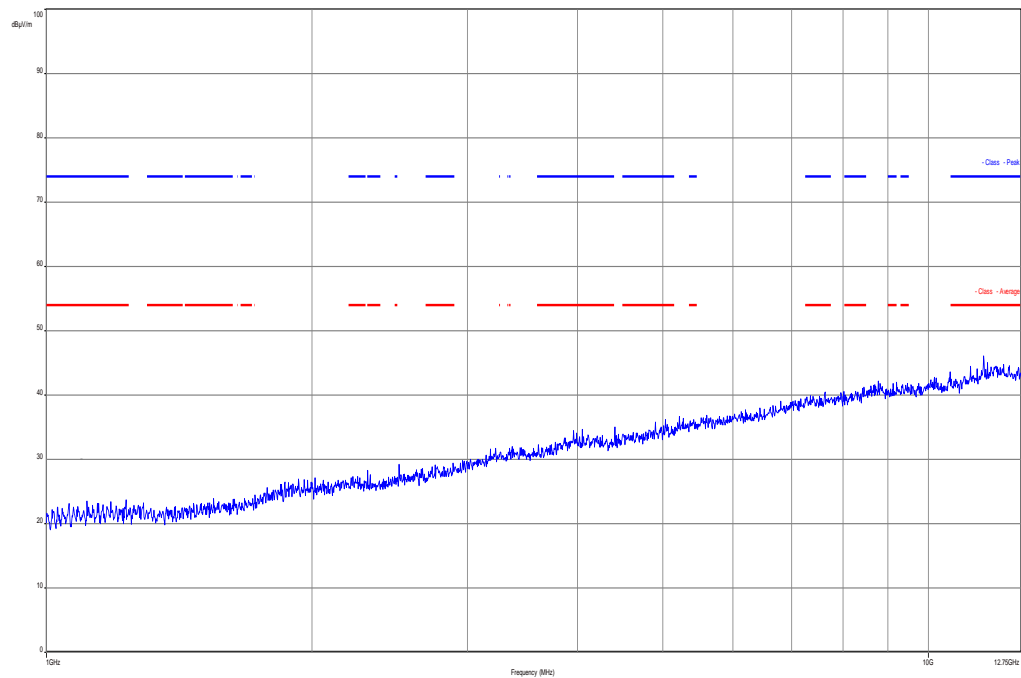
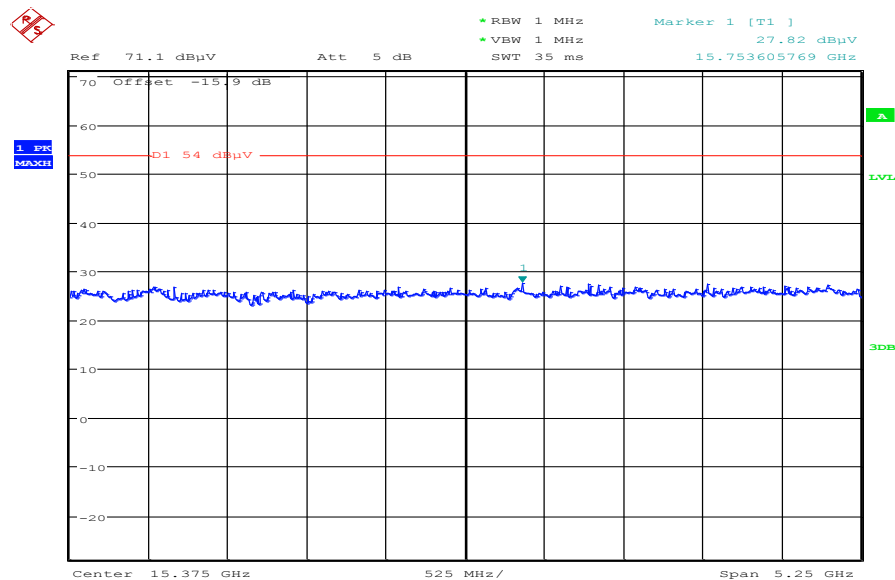
RX spurious emissions radiated [dB $\mu$ V/m]		
F [MHz]	Detector	Level [dB $\mu$ V/m]
For emissions below 1 GHz, please take a look at the table below the 1 GHz plot.		
All peak emissions above 1 GHz are more Than 6 dB below the average limit		
Measurement uncertainty	$\pm 3$ dB	

**Result:** Passed

**Note:** The limit was recalculated with 20 dB / decade (Part 15.31) for all radiated spurious emissions 30 MHz to 1 GHz from 3 meter limit to a 10 meter distance. (40dB/decade for emissions < 30MHz)

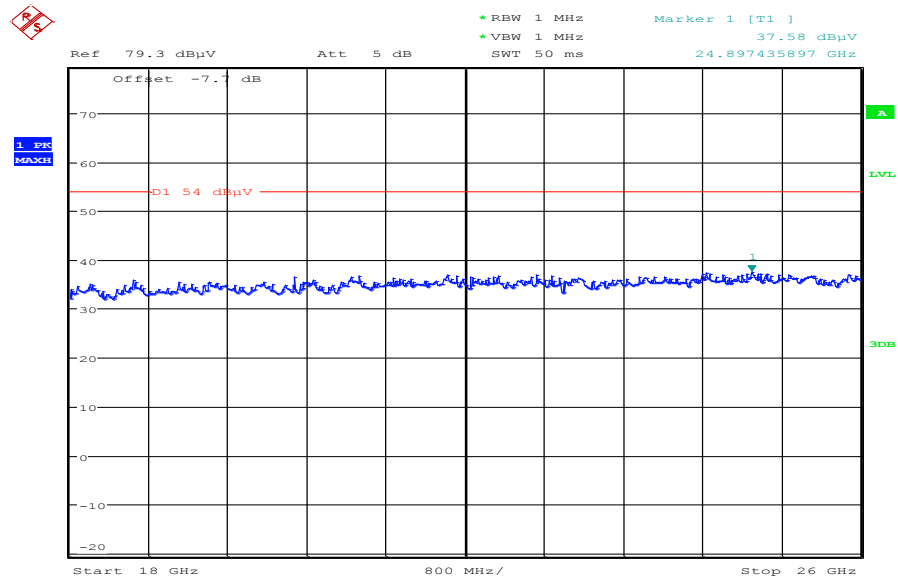
**Plots:****Plot 1:** 30 MHz to 1 GHz, RX / idle – mode, vertical & horizontal polarization**Final\_Result**

Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
40.113000	11.32	30.00	18.68	1000.0	120.000	98.0	V	115	14.0
44.423400	11.07	30.00	18.93	1000.0	120.000	101.0	V	295	13.9
61.165650	7.72	30.00	22.28	1000.0	120.000	170.0	V	0	10.3
339.074250	12.30	36.00	23.70	1000.0	120.000	170.0	H	156	15.7
694.604550	18.84	36.00	17.16	1000.0	120.000	98.0	H	245	21.5
801.178500	19.92	36.00	16.08	1000.0	120.000	98.0	H	0	22.7

**Plot 2:** 1 GHz to 12.75 GHz, RX mode, vertical & horizontal polarization**Plot 3:** 12.75 GHz to 18 GHz, RX mode, vertical & horizontal polarization

Date: 27.OCT.2014 09:40:58

**Plot 4:** 18 GHz to 26 GHz, RX mode, vertical & horizontal polarization



Date: 27.OCT.2014 09:39:03

## 10.6 Spurious emissions radiated < 30 MHz

### Description:

Measurement of the radiated spurious emissions in transmit mode below 30 MHz. The EUT is set to single channel mode and the transmit channel is channel 19. This measurement is representative for all channels and modes. If critical peaks are found channel 00 and channel 39 will be measured too. The measurement is performed in the mode with the highest output power. The limits are recalculated to a measurement distance of 3 m with 40 dB/decade according CFR Part 2.

### Measurement:

Measurement parameter	
Detector:	Peak / Quasi peak
Sweep time:	Auto
Resolution bandwidth:	F < 150 kHz: 1 kHz F > 150 kHz: 100 kHz
Video bandwidth:	F < 150 kHz: 200 Hz F > 150 kHz: 9 kHz
Span:	9 kHz to 30 MHz
Trace-Mode:	Max Hold

### Limits:

FCC		IC
TX spurious emissions radiated < 30 MHz		
Frequency (MHz)	Field strength (dB $\mu$ V/m)	Measurement distance
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30.0	30	30

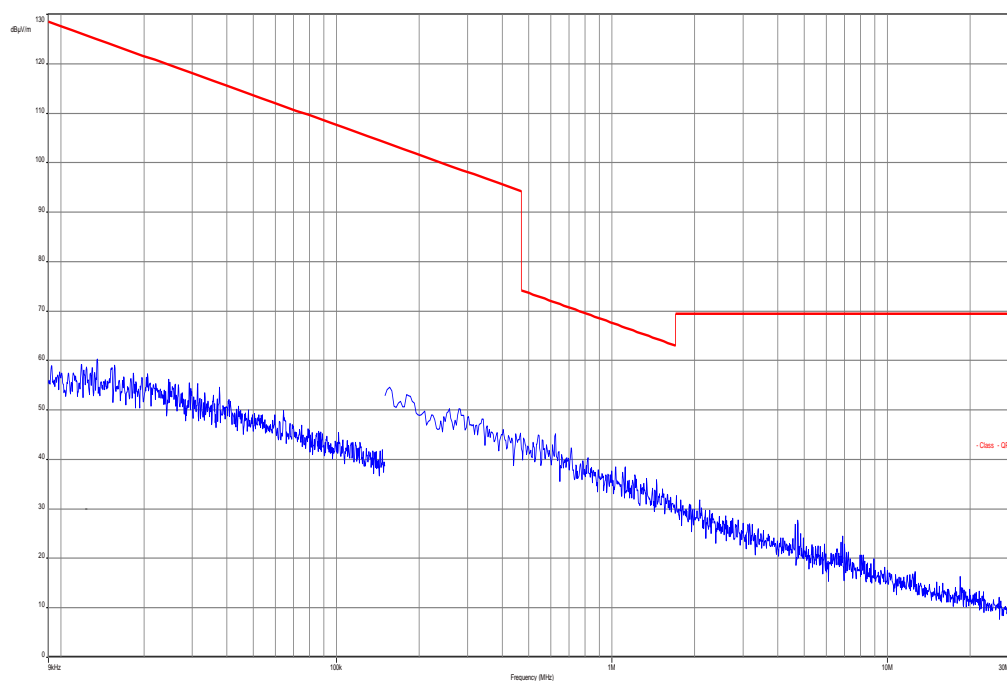
### Results:

TX spurious emissions radiated < 30 MHz [dB $\mu$ V/m]		
F [MHz]	Detector	Level [dB $\mu$ V/m]
No peaks found!		
Measurement uncertainty	$\pm 3$ dB	

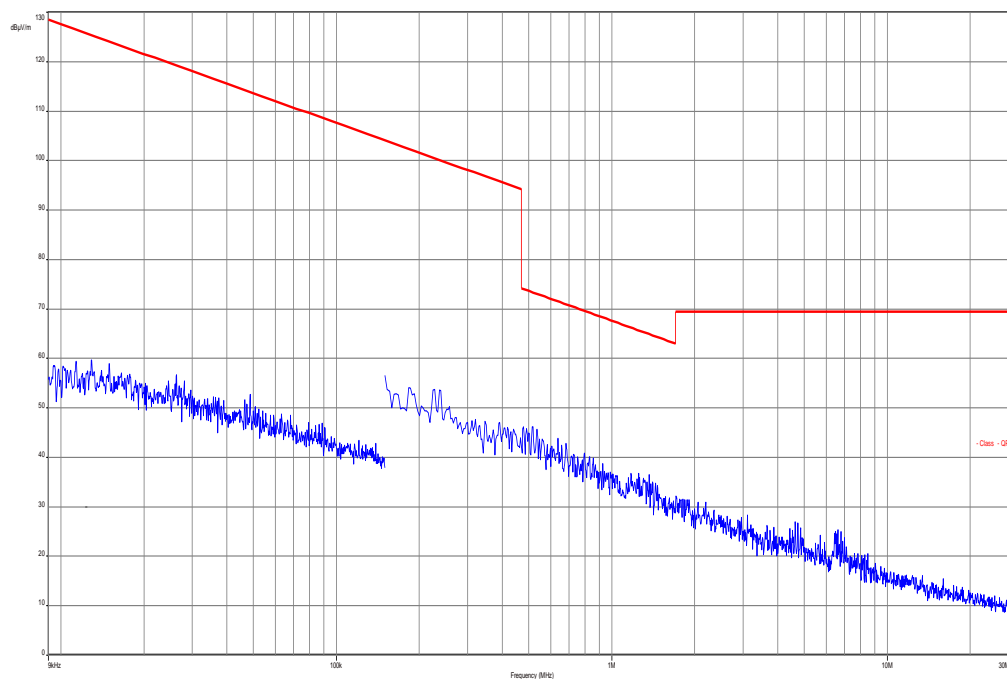
**Result:** Passed

**Plot:**

**Plot 1: 9 kHz to 30 MHz, TX mode**



**Plot 2: 9 kHz to 30 MHz, RX mode**



## 11 Test equipment and ancillaries used for tests

Typically, the calibrations of the test apparatus are commissioned to and performed by an accredited calibration laboratory. The calibration intervals are determined in accordance with the DIN EN ISO/IEC 17025. In addition to the external calibrations, the laboratory executes comparison measurements with other calibrated test systems or effective verifications. Weekly chamber inspections and range calibrations are performed. Where possible, rf-generating and signalling equipment as well as measuring receivers and analyzers are connected to an external high-precision 10 MHz reference (GPS-based or rubidium frequency standard).

In order to simplify the identification of the equipment used at some special tests, some items of test equipment and ancillaries can be provided with an identifier or number in the equipment list below (Lab/Item).

No.	Lab / Item	Equipment	Type	Manufact.	Serial No.	INV. No Cetecom	Kind of Calibration	Last Calibration	Next Calibration
1	45	Switch-Unit	3488A	HP Meßtechnik	2719A14505	300000368	q		
2	50	DC power supply, 60Vdc, 50A, 1200 W	6032A	HP Meßtechnik	2920A04466	300000580	ne		
3	n. a.	Amplifier	JS42-00502650-28-5A	MITEQ	1084532	300003379	ev		
4	n. a.	Antenna Tower	Model 2175	ETS-LINDGREN	64762	300003745	izw		
5	n. a.	Positioning Controller	Model 2090	ETS-LINDGREN	64672	300003746	izw		
6	n. a.	Turntable Interface-Box	Model 105637	ETS-LINDGREN	44583	300003747	izw		
7	n. a.	TRILOG Broadband Test-Antenna 30 MHz - 3 GHz	VULB9163	Schwarzbeck	295	300003787	k	22.04.2014	22.04.2016
8	n. a.	Spectrum-Analyzer	FSU26	R&S	200809	300003874	k	22.01.2014	22.01.2015
9	n. a.	DC power supply, 60Vdc, 50A, 1200 W	6032A	HP Meßtechnik	2818A03450	300001040	Ve	12.01.2012	12.01.2015
10	n. a.	Double-Ridged Waveguide Horn Antenna 1-18.0GHz	3115	EMCO	8812-3088	300001032	vIKII	08.05.2013	08.05.2015
11	n. a.	Anechoic chamber	FAC 3/5m	MWB / TDK	87400/02	300000996	ev		
12	n. a.	Switch / Control Unit	3488A	HP Meßtechnik	*	300000199	ne		
13	9	Artificial Mains 9 kHz to 30 MHz	ESH3-Z5	R&S	828576/020	300001210	Ve	30.01.2014	30.01.2016
14	9	Isolating Transformer	MPL IEC625 Bus Regeltrenntravo	Erli	91350	300001155	ne		
15	90	Active Loop Antenna 10 kHz to 30 MHz	6502	Kontron Psychotech	8905-2342	300000256	k	13.06.2013	13.06.2015
16	n. a.	Amplifier	js42-00502650-28-5a	Parzich GMBH	928979	300003143	ne		
17	n. a.	Band Reject filter	WRCG2400/2483-2375/2505-50/10SS	Wainwright	11	300003351	ev		
18	n. a.	Highpass Filter	WHKX7.0/18G-8SS	Wainwright	18	300003789	ne		
19	n. a.	TRILOG Broadband Test-Antenna 30 MHz - 3 GHz	VULB9163	Schwarzbeck	371	300003854	vIKII	14.10.2011	14.10.2015
20	n. a.	MXE EMI Receiver 20 Hz bis 26,5 GHz	N9038A	Agilent Technologies	MY51210197	300004405	k	13.03.2014	13.03.2015
21	n. a.	4U RF Switch Platform	L4491A	Agilent Technologies	MY50000037	300004509	ne		
22	11b	Microwave System Amplifier, 0.5-26.5 GHz	83017A	HP Meßtechnik	00419	300002268	ev		
23	A026	Std. Gain Horn Antenna 12.4 to 18.0 GHz	639	Narda	8402	300000787	k	22.07.2013	22.07.2015
24	A029	Std. Gain Horn Antenna 18.0 to 26.5 GHz	638	Narda	8205	300002442	k	19.07.2013	19.07.2015
25	n. a.	Broadband Low Noise Amplifier 18-50 GHz	CBL18503070-XX	CERNEX	19338	300004273	ne		
26	n. a.	Signal Analyzer 40 GHz	FSV40	R&S	101042	300004517	k	22.10.2014	22.01.2016
27	A031	Std. Gain Horn Antenna 26.5 to 40.0 GHz	637	Narda	GB42110541	300000510	k	19.07.2013	19.07.2015



**Agenda:** Kind of Calibration

k	calibration / calibrated	EK	limited calibration
ne	not required (k, ev, izw, zw not required)	zw	cyclical maintenance (external cyclical maintenance)
ev	periodic self verification	izw	internal cyclical maintenance
Ve	long-term stability recognized	g	blocked for accredited testing
vkI!	Attention: extended calibration interval		
NK!	Attention: not calibrated	*)	next calibration ordered / currently in progress

## 12 Observations

No observations except those reported with the single test cases have been made.

**Annex A Document history**

Version	Applied changes	Date of release
	Initial release	2014-11-13

**Annex B Further information****Glossary**

AVG	-	Average
DUT	-	Device under test
EMC	-	Electromagnetic Compatibility
EN	-	European Standard
EUT	-	Equipment under test
ETSI	-	European Telecommunications Standard Institute
FCC	-	Federal Communication Commission
FCC ID	-	Company Identifier at FCC
HW	-	Hardware
IC	-	Industry Canada
Inv. No.	-	Inventory number
N/A	-	Not applicable
PP	-	Positive peak
QP	-	Quasi peak
S/N	-	Serial number
SW	-	Software

## Annex C Accreditation Certificate

Front side of certificate

Back side of certificate



Deutsche Akkreditierungsstelle GmbH

Befehlens gemäß § 8 Absatz 1 AkkStelleG i.V.m. § 1 Absatz 1 AkkStelleGBV  
 Unterzeichnerin der Multilateralen Abkommen  
 von EA, ILAC und IAF zur gegenseitigen Anerkennung

### Akkreditierung



Die Deutsche Akkreditierungsstelle GmbH bestätigt hiermit, dass das Prüflaboratorium

**CETECOM ICT Services GmbH**  
 Untertürkheimer Straße 6-10, 66117 Saarbrücken

die Kompetenz nach DIN EN ISO/IEC 17025:2005 besitzt, Prüfungen in folgenden Bereichen durchzuführen:

Drahtgebundene Kommunikation einschließlich xDSL  
 VoIP und DECT  
 Akustik  
 Funk einschließlich WLAN  
 Short Range Devices (SRD)  
 RFID  
 WiMax und Richtfunk  
 Mobilfunk (GSM / DC, Over the Air (OTA) Performance)  
 Elektromagnetische Verträglichkeit (EMV) einschließlich Automotive  
 Produktsicherheit  
 SAR und Hearing Aid Compatibility (HAC)  
 Umweltsimulation  
 Smart Card Terminals  
 Bluetooth  
 Wi-Fi Services

Die Akkreditierungsurkunde gilt nur in Verbindung mit dem Beschluss vom 07.03.2014 mit der  
 Akkreditierungsnummer D-PL-12076-01 und ist gültig 17.01.2018. Sie besteht aus diesem Deckblatt, der  
 Rückseite des Deckblatts und der folgenden Anlage mit insgesamt 77 Seiten.

Registrierungsnummer der Urkunde: D-PL-12076-01-00

Frankfurt am Main, 07.03.2014

Datei: 01-01-01-01-01-01

Dr. Andrea Dittmann  
 Akkreditierungsleiter

Deutsche Akkreditierungsstelle GmbH

Standort Berlin  
 Spittelmarkt 10  
 10117 Berlin

Standort Frankfurt am Main  
 Gartenstraße 6  
 60594 Frankfurt am Main

Standort Braunschweig  
 Bundesallee 100  
 38115 Braunschweig

Die auszugsweise Veröffentlichung der Akkreditierungsurkunde bedarf der vorherigen schriftlichen  
 Zustimmung der Deutschen Akkreditierungsstelle GmbH (DAkkS). Ausgenommen davon ist die separate  
 Weiterverbreitung des Deckblatts durch die umseitig genannte Kontaktpersonen der DAkkS in  
 unveränderter Form.

Es darf nicht der Anschein erweckt werden, dass sich die Akkreditierung auch auf Bereiche erstreckt,  
 die über den durch die DAkkS bestätigten Akkreditierungsbereich hinausgehen.

Die Akkreditierung erfolgte gemäß dem Gesetz über die Akkreditierungsstelle (AkkStelleG) vom  
 31. Juli 2009 (BGBl. I S. 2675) sowie der Verordnung (EG) Nr. 765/2008 des Europäischen Parlaments  
 und des Rates vom 9. Juli 2008 über die Vorschriften für die Akkreditierung und Marktüberwachung  
 im Zusammenhang mit der Vermarktung von Produkten (Abt. L 218 vom 9. Juli 2008, S. 30).  
 Die DAkkS ist Unterzeichnerin der Multilateralen Abkommen zur gegenseitigen Anerkennung der  
 Prüfungen in operation für Akkreditierung (EA), des Internationalen Akkreditationsforum (IAF) und  
 der International Laboratory Accreditation Cooperation (ILAC). Die Unterzeichner dieser Abkommen  
 erkennen ihre Akkreditierungen gegenseitig an.

Der aktuelle Stand der Mitgliedschaft kann folgenden Webseiten entnommen werden:  
 EA: [www.european-accreditation.org](http://www.european-accreditation.org)  
 IAF: [www.iaf.org](http://www.iaf.org)  
 ILAC: [www.ilac.org](http://www.ilac.org)

### Note:

The current certificate including annex is published on our website (see link below) or may be received from CETECOM ICT Services on request.

<http://www.cetecom.com/eu/de/cetecom-group/europa/deutschland-saarbruecken/akkreditierungen.html>